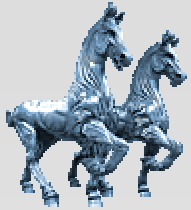


Mine Detection and Alternatives to Antipersonnel Landmines

Thomas W. Altshuler
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DSO

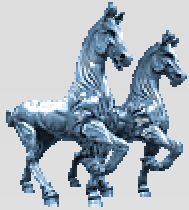


The Programs

- Electronic Dog's Nose



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The Programs

- Self-Healing Minefield
- Tags and Minimally Guided Munitions

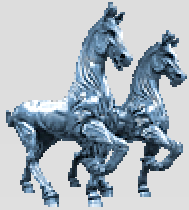


Antipersonnel Landmine Debate

*Challenge is finding creative
technology solutions in this
highly constrained
environment*

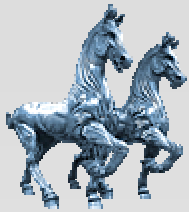


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The DARPA Approach

- Innovative maneuver denial approaches
 - Employ advanced technologies
 - Provide increased warfighting capability

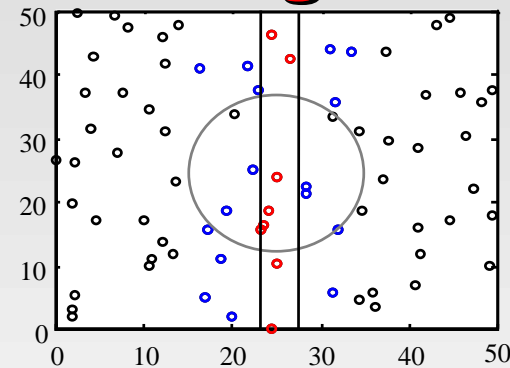


Two Innovative Approaches

**Mixed Munitions
Protection of AT
minefields**



Self-Healing Minefield

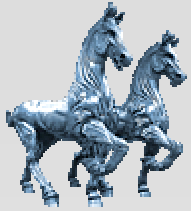


Tags/MGM

**Dismounted
Infantry
Korean DMZ**

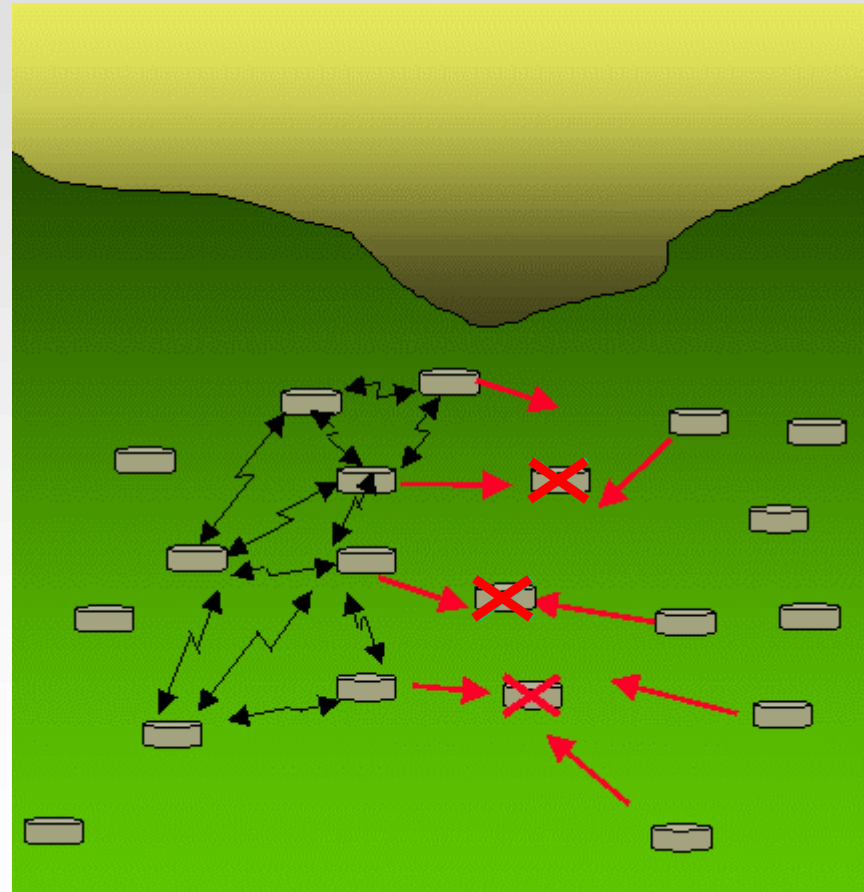


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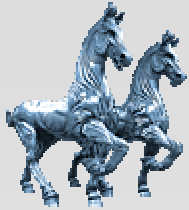


Self-Healing Minefield

Dynamic
antitank
minefield used
to complicate
breaching and
preserve the
obstacle

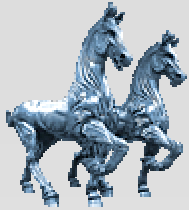


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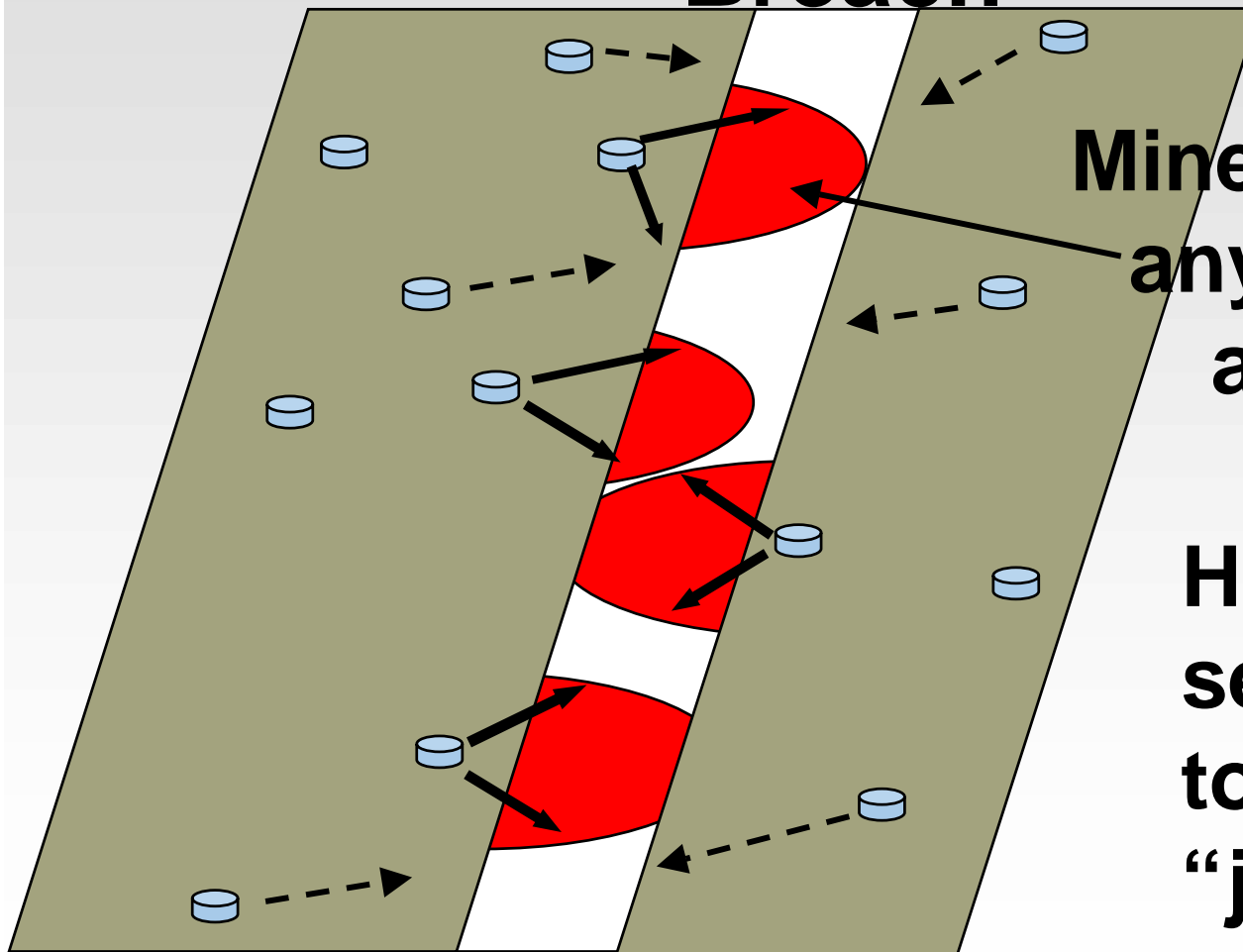
Operational Concept

- Scatterable surface antitank mines
- Minefield detects breach
- Individual mines reorganize to defeat breach



Response to Breach

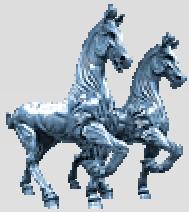
Breach



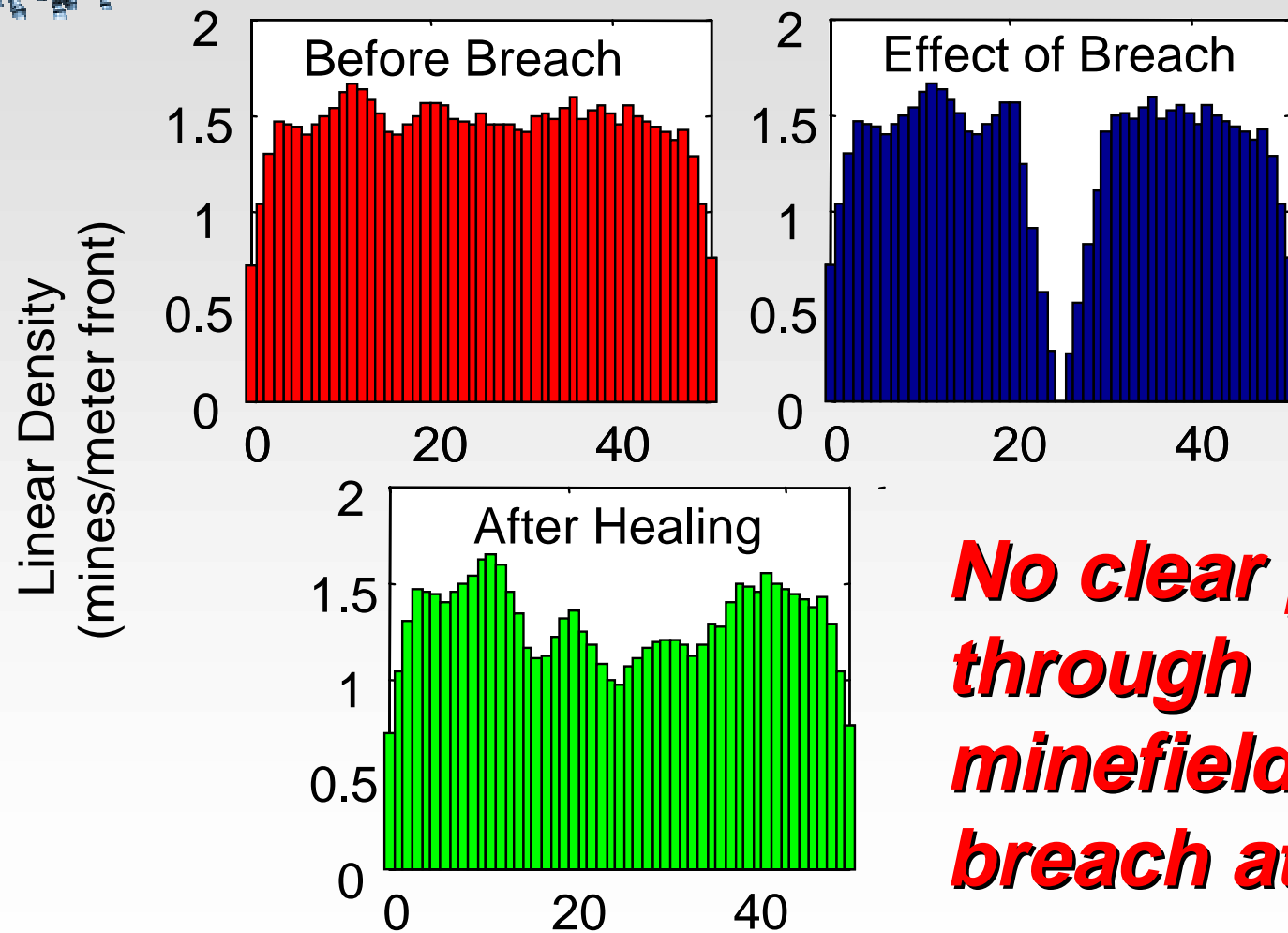
**Mine can move
anywhere in
annulus**

**Healing not
sensitive
to details of
“jump”**

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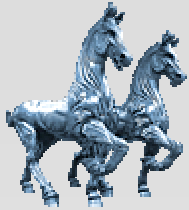


Healing Algorithms



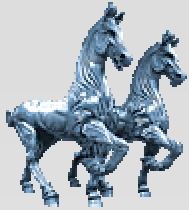
***No clear path
through
minefield after
breach attempt***

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Mine Mobility

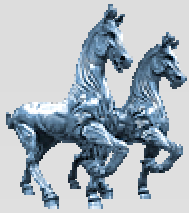
- Healing is a statistical process
- Simple mobility needed
- Will be fault tolerant
- **NO COMPLEX ROBOTICS**



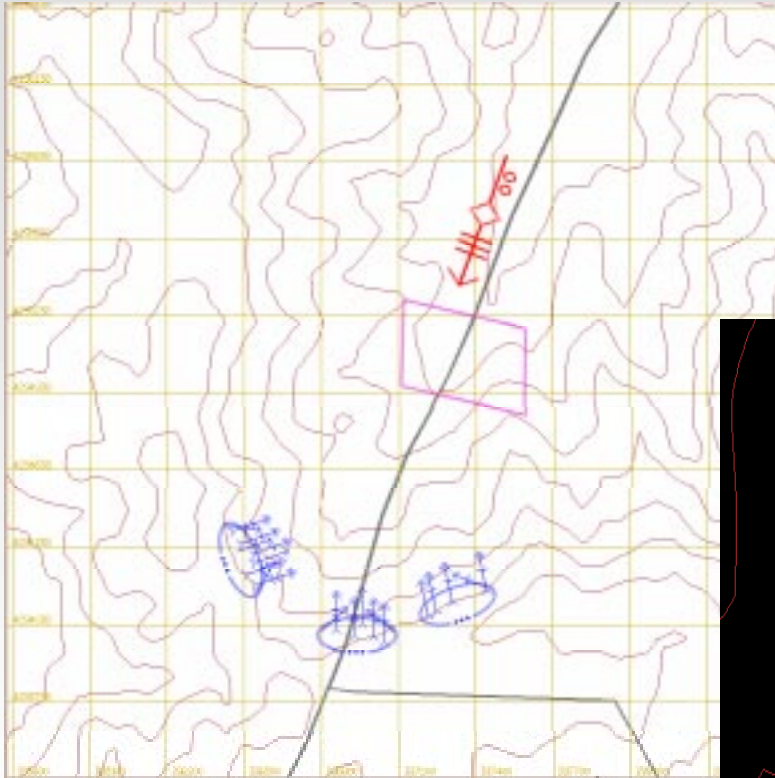
System Benefits

- Prevents/impedes breach without antipersonnel landmines
- Opportunity for control of minefield
- Enemy must **clear** minefield

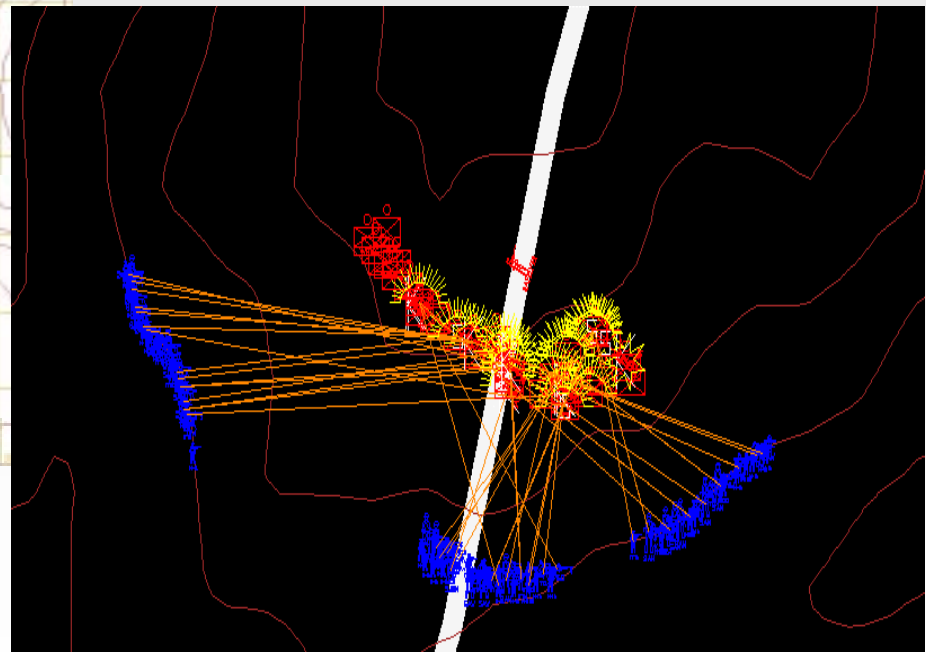
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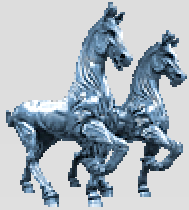
Battlefield Utility



- North Korean mechanized battalion
- 3 rifle platoons

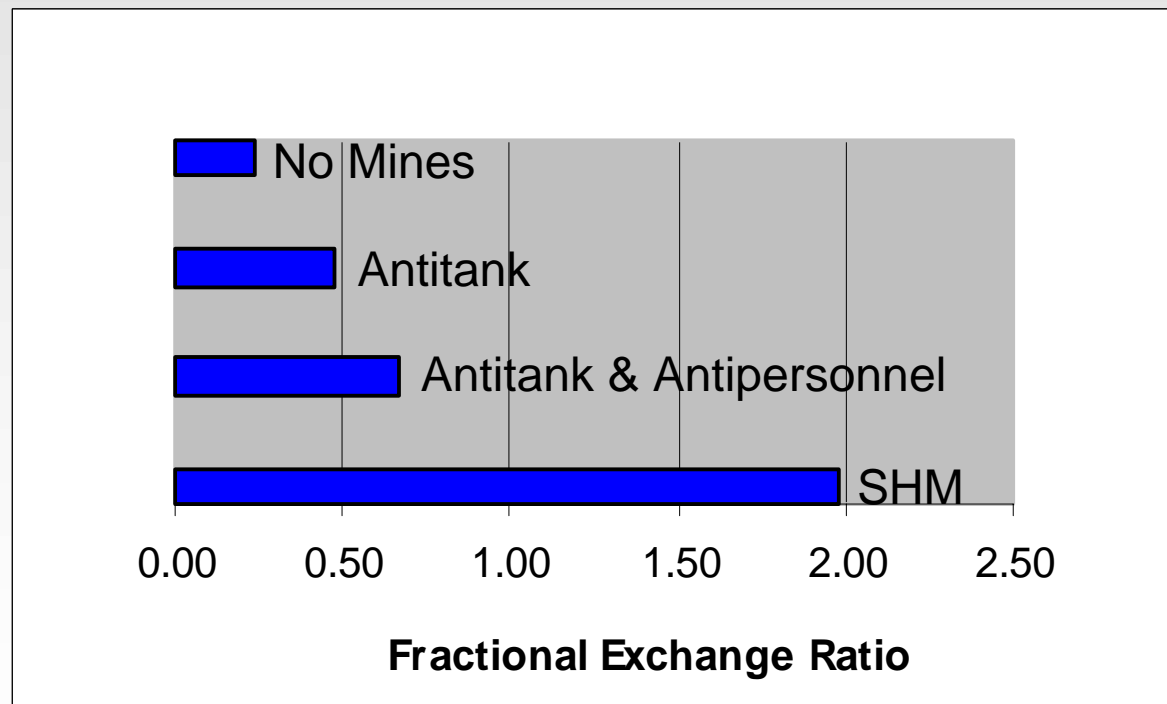


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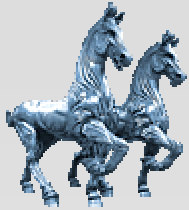


Battlefield Utility

The Self-Healing Minefield significantly increases Blue battle performance



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Development Issues

- Distributed network comm.
 - Low power
 - Jam resistant
- Mine mobility
 - Multi-hop reorganization
- Healing behaviors
 - Provides battlefield capability

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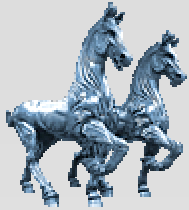


Tags/Minimally Guided Munitions

- Attack enemy dismounted maneuver by:
 - affixing tags to the individual soldier
 - employing rapid response, dedicated, guided, indirect fire



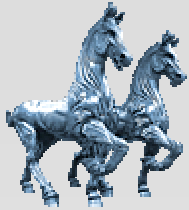
DSO



Tags/MGM Concept

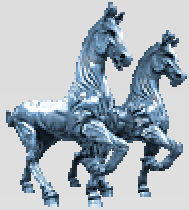
- Tags are burr-like transmitters picked up as enemy moves through engagement area
- Munitions are simple course correction, cueing on tag to keep dismounted soldier in kill box

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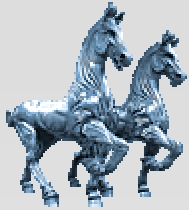
Study Issues

- Tags
 - Development of millimeter-size transmitters
 - Relay information to munition launch point and during flight
 - Power
 - Packaging, adhesion, cueing, delivery of tags, etc.



Study Issues

- Minimally Guided Munitions
 - C2 - man-in-loop
 - Low cost/high sensitivity receiver
 - Indirect fire - group dynamics and individual feedback
 - Time-of-flight, flight control, logistics, overall efficiency, etc.



Program Status

- Electronic Dog's Nose
 - www.darpa.mil/dso/rd/applied/uxo
- Self-Healing Minefield
 - BAA 99-21 currently open
 - baa99-21@darpa.mil
- Tags/Minimally Guided Munitions
 - FY99 study phase
 - BAA anticipated fall, 1999

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